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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/821,458	04/09/2004	John Grebenkemper	200312380-1	1351

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FORT COLLINS, CO 80527-2400

EXAMINER
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NGUYEN, HOA CAO

ART UNIT	PAPER NUMBER
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2841

DATE MAILED: 08/10/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

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<b>Office Action Summary</b>	<b>Application No.</b> 10/821,458	<b>Applicant(s)</b> GREBENKEMPER ET AL.	
	<b>Examiner</b> Hoa C. Nguyen	<b>Art Unit</b> 2841	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 19 June 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) 1-15 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 16-23 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)               | Paper No(s)/Mail Date. _____  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>4 pg.</u>   | 6) <input type="checkbox"/> Other: _____                                    |

### DETAILED ACTION

1. Applicant's election with traverse of group III (claims 16-23) and species 1 (figure 1), in the reply filed on 6/19/06 is acknowledged. The traversal is on the ground(s) that:

(a) Remarks, page 2 and 3: Group (II) and (I, III) recite the same invention.

The examiner disagrees, because the structure of the circuit board can be formed with a different method, which was clearly explained in the Office action mailed on 5/22/06. Therefore, the restriction is proper.

(b) Remarks, page 3: Applicants argue that claims 1, 8, and 16 are generic to the figures 1, 5, 6, 7, 8 and 9.

After selection one of the Group, applicants are requested to select one of the Species for Examination. The Election/Restriction on the Species is proper, because the specification discloses a plurality of embodiments, wherein each embodiment contains different details from the others. And, even if claims 1, 8, and 16 are generic, the request for Election/Restriction is still proper and the applicants still have to elect one species for examination. Furthermore, in amending the claims (claims 16-23) that may occur in the future, applicants can not amend the claims outside the scope of the specification, which discloses the detail descriptions of the selected Species (Species 1, figure 1).

(c) Remarks, page 3, last paragraph: The election of Group II and III.

As discuss above, Group II claims a method, while group III claims a structure. Therefore, the election of both groups at the same time is improper will not be considered by the Examiner.

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Finally, the requirement is still deemed proper and is therefore made **FINAL**.

Thus, only Group III (claims 16-23) and Species 1 (figure 1) are considered in this Office Action.

***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 16-22 are rejected under 35 U.S.C. 102(e) as being anticipated by Goergen (US 2003/0177638).

**Regarding claim 16**, as shown in figure 8, Goergen discloses an electronic system comprising a multi-layer printed circuit board (a router back plane, paragraph 18) including:

(a) A plurality of power planes L16-L19 (paragraph 135);

(b) a plurality of signal layers HS1-HS10 (high-speed signaling, paragraph 95);

and

(c) a plurality of ground planes GND (paragraph 95), wherein at least one of the plurality of ground planes is positioned between each group of one or more of the plurality of power planes (considering L16-L19 is the power group) and each group of one or more of the signal layers (considering each HS<sub>n</sub> is a signal group and also layers

L13-L14, the low speed signaling, paragraph 97) is to isolate each of the groups of one or more of the power planes from each of the groups of one or more of the signal layers.

**Regarding claim 17**, as shown in figure 8, Goergen discloses at least a portion of the plurality of signal layers HS1-HS10 (high speed signaling, paragraph 95) that include signal traces on a single side of a core layer (considering signal layers formed on the B-stage, paragraph 95).

**Regarding claim 18**, as shown in figure 8, Goergen discloses at least a portion of the plurality of signal layers (signal X1/Y1, paragraph 131) that include signal traces on two sides of a core layer LS B-stage (paragraphs 35 and 95).

**Regarding claim 19**, as shown in figure 8, Goergen discloses an insulating layer (Core, LS Core, B-stage and LS B-stage, paragraph 95) positioned between each of the power planes, the ground plane, and the signal layers.

**Regarding claim 20**, as clearly shown in figure 8, Goergen further discloses a ground plane positioned proximate each of the signal layers.

**Regarding claim 21**, as clearly shown in figure 8, Goergen further discloses a pads layer L01 (paragraphs 95 and 166) positioned on at least one outer surface of the printed circuit board.

**Regarding claim 22**, Goergen inherently discloses an integrated circuit (no number, see figure 2) mounted on the printed circuit board. It is noted that conductive pads formed on the outer layer L01 of the PCB is for mounting integrated circuit.

***Claim Rejections - 35 USC § 103***

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4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Goergen (US 2003/0177638).

**Regarding claim 23**, Goergen discloses every limitation as shown 16 above including the plurality of power planes are positioned adjacent to a ground plane and separated by an insulating layer. But, Goergen does not disclose the insulating layer having a thickness of approximately less than 1 mil.

It is old and known in the art that the thickness including the material of an insulator formed in within a circuit board is only a matter of choice depending upon particular applications (matching impedance for example).

As clearly shown in figure 8, Goergen discloses insulator layers with different thickness depending upon its application whether or not the insulator layer is for high-speed signaling, low-speed signaling, or just for power.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to make an adjustment on the thickness of the insulating layers to less than 1 mil in order to optimize the thickness of the PCB in applications that require only a small power consumption and the thick insulators are no longer necessary, and since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

***Citation of Relevant Art***

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

Cheng (US 6489570) disclose a multi-layer circuit board.

Cheng (US 6417460) disclose a multi-layer circuit board having signal, ground and power layers.

Wyrzykowska et al. (US 7069650) disclose a method for reducing the number of layers in a multilayer signal routing device.

Chan et al. (US 6995322) disclose a high speed circuitized substrate with reduced thru-hole stub, method for fabrication and information handling system utilizing same.

Fraley et al. (US 7035113) disclose a multi-chip electronic package having laminate carrier and method of making same.

Peterson (US 6750403) discloses a reconfigurable multilayer printed circuit board.

Higgins (US 5039965) discloses a radio frequency filter feedthrough structure for multilayer circuit boards.

Kuwabara et al. (US 4675789) disclose a high density multilayer printed circuit board.

Nakano et al. (US 6785121) disclose a multilayer ceramic capacitor and production method thereof.

Figueroa et al. (US 6532143) disclose a multiple tier array capacitor.

### ***Conclusion***

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hoa C. Nguyen whose telephone number is 571-272-8293. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kammie Cuneo can be reached on 571-272-1957. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

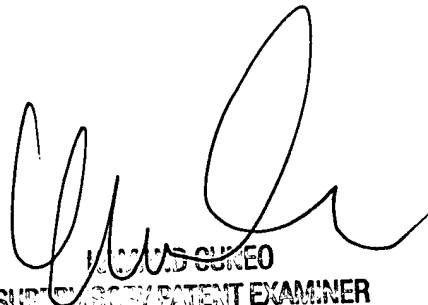
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USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Hoa C. Nguyen  
7/28/06



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